

INSTALLATION INSTRUCTIONS

ROOF MOUNT PACKAGED AIR CONDITIONER

MODELS

RPMA42

RPMA48

RPMA60

**SPECIALLY DESIGNED FOR ROOFTOP
HEATING/COOLING APPLICATIONS**

MANUAL 2100-108 REV. H
SUPERSEDES REV. G
FILE VOL. II, TAB 10

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BRYAN, OHIO

INDEX

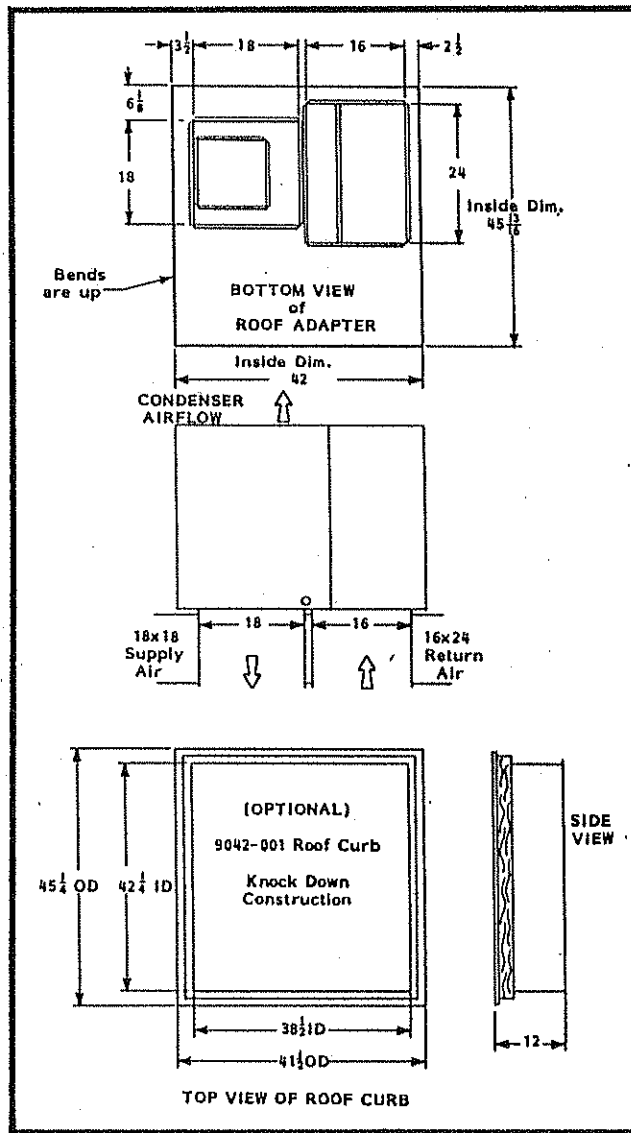
Important	5
Shipping Damage	5
Unpacking The Self-Contained Unit	5
General	5
Installation.	5
Ductwork	6
Locating The Unit	6
Roof Curb Fabrication	6
Optional Electric Heater Packages	6
Installation	6
Wiring--Main Power	6
Condensate Drainage	7
Pressure Service Ports	7
Refrigerant Charge	7
Air Filter	7
Fresh Air Intake	7
Crankcase Heaters	8
Fan Blade Setting Dimensions	9
Service Hints	9

INDEX OF FIGURES AND TABLES

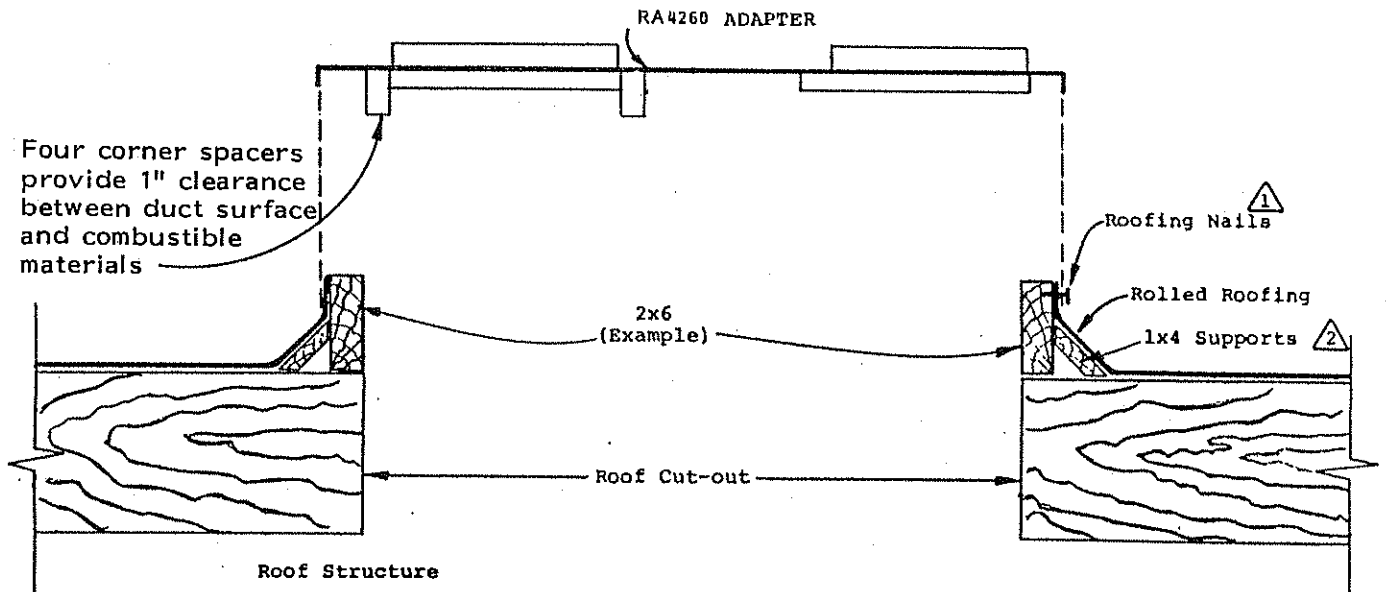
Figure 1	1
Figure 2	2
Figure 3	8
Figure 4	9

Table 1	3
Table 2	3
Table 3	4
Table 4	4
Table 5	9
Table 6	10

Figure 1

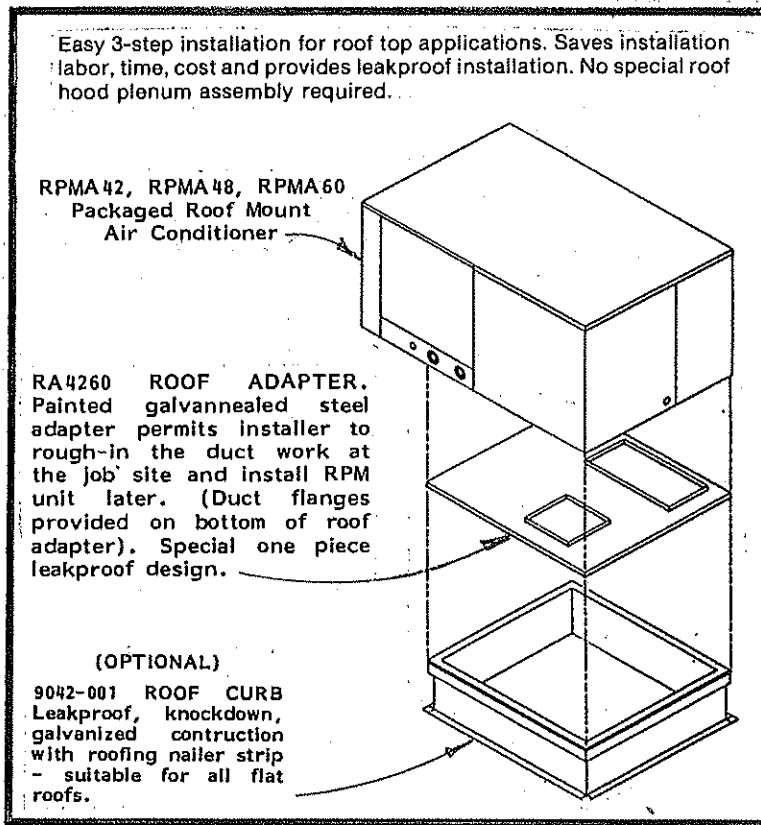


TYPICAL CONSTRUCTION FOR DIMENSIONAL LUMBER EXTENSION CONSTRUCTION



- 1 Nail 3/4" from top.
- 2 Provides support to roofing material, prevents sharp bends and cracking.

FIGURE 2



UNIT LIFTING BRACKET

Four lifting brackets with fasteners are supplied with the basic unit. These brackets are inserted next to the unit control panel. Access to these brackets is gained by removing the outer control panel cover. These brackets can be installed using the mating holes along the unit base.

TIE DOWN BRACKET

Two tie down brackets are supplied. After the unit has been lifted on to the roof adapter/curb assembly, attach the tie down brackets to the lifting brackets as shown.

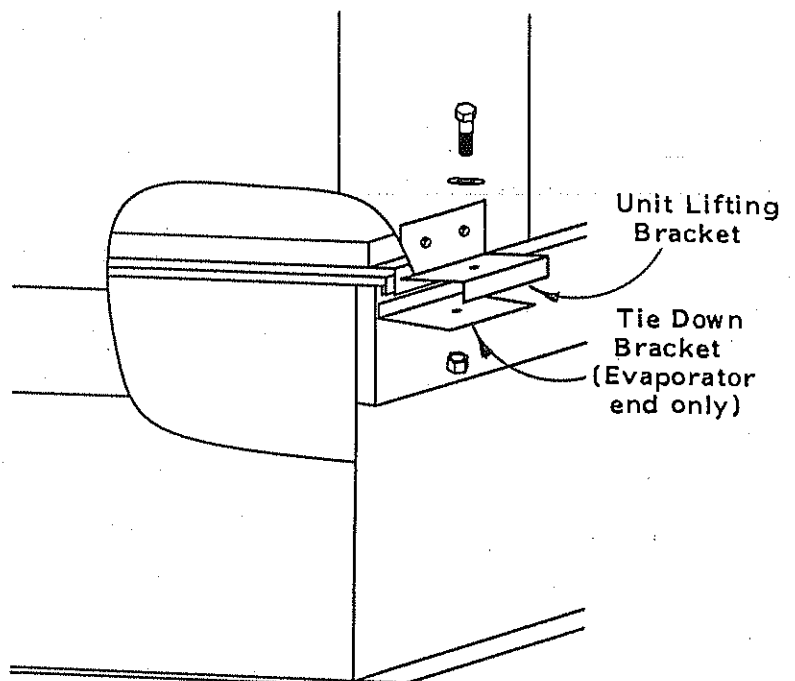


TABLE 1
INDOOR BLOWER PERFORMANCE
CFM -- DRY COIL WITH FILTER

E.S.P. in H2O	RPMA42			RPMA48			RPMA60	
	High Speed	Medium Speed	Low Speed	High Speed	Medium Speed	Low Speed	High Speed	Low Speed
.0	1995	1920	1775	2160	2075	1860	2250	2100
.10	1935	1870	1735	2080	1980	1810	2180	2045
.20	1865	1800	1670	1995	1920	1735	2100	1975
.30	1770	1700	1600	1910	1840	1670	2020	1910
.40	1680	1610	1525	1820	1745	1590	1925	1840
.50	1580	1525	1430	1715	1650	1510	1845	1750
.60	1480	1420	1340	1615	1550	1420	1740	1660

TABLE 2
ELECTRICAL DATA

Model	Rated Volts & PH	Operating Voltage Range	Max. Unit Amps 230/208	Req'd. Maximum	Minimum	Field Power Wiring**	Ground Wire Size**
				External Fuses Or Ckt. Brk *			
				Ckt. A	Ckt. A	Ckt. A	Ckt. A
RPMA42	230/208-1	197-253	24/26	50	34	8	10
RPMA42-B	230/208-3	187-253	18/19.5	35	25	10	10
RPMA42-C+	460-3	414-506	10.0	15	15	14	14
RPMA48	230/208-1	197-253	28.6/31.1	60	38	8	10
RPMA48-B	230/208-3	187-253	21.5/23	40	27	10	10
RPMA48-C+	460-3	414-506	12.0	20	15	14	14
RPMA60	230/208-1	197-253	34.8/38.8	60	47	6	10
RPMA60-B	230/208-3	187-253	26.3/28.3	50	34	8	10
RPMA60-C+	460-3	414-506	13.4	25	16	12	12

*Maximum time delay fuse or HACR type circuit breaker. HACR type not applicable to 460 volt.

**60 degree C copper wire size, basic unit only.

+460 volt not U.L. listed.

TABLE 3
OPTIONAL FIELD-INSTALLED ELECTRIC HEATER TABLE

Heater Pkg. Model No.	Unit Volts Phase	Htr. KW & Cap. @240V (or 480V if applicable)		Heater KW & Capacity @208 Volts		@240V or 480V as Applicable Htr. Amps	Heater Internal Fuses	Circuit B				
		KW	BTUH	KW	BTUH			No. Field Ckts.	Minimum Circuit Ampacity	Maximum Overcurrent Protection	① Field Power Wiring	② Ground Wire Size
EH5RA-A10	240/208-1	10	34,100	7.5	25,600	41.6/36.2		1	53/46	60/50	6/6	10
EH5RA-A15	240/208-1	15	51,200	11.25	38,400	62.5/54.1	30/60	1	79/68	80/70	3/4	8
EH5RA-A20	240/208-1	20	68,200	15.0	51,200	83.2/72.1	60/60	1	104/91	110/100	2/3③	6
EH5RA-A25	240/208-1	25	85,300	18.75	64,000	104.2/90.1	30/60/60	1	130/113	150/125	1/2③	6
EH5RA-B09	240/208-3	9	30,700	6.75	23,000	21.7/18.7		1	28/24	30/25	10/10	10
EH5RA-B15	240/208-3	15	51,200	11.25	38,400	36.2/31.2		1	46/39	50/40	6/8	10
EH5RA-B24	240/208-3	24	81,900	18.0	61,400	57.9/50.0	40/40/40	1	73/63	80/70	3/4	8
EH5RA-C09	460-3	9	30,700	6.75	23,000	10.8		1	15	15	14	14
EH5RA-C15	460-3	15	51,200	11.25	38,400	18.0		1	23	25	10	10
EH5RA-C24	460-3	24	81,900	18.0	61,400	28.8		1	36	40	8	10

- ① Based on wire suitable for 60 degrees C. Other wiring materials must be rated for marked "Minimum Circuit Ampacity" or greater.
- ② Based upon Table 250-95 of N.E.C. 1984. See electrical data for basic heat pump for Ckt. A wiring specification requirements.
- ③ For ampacities over 100 amperes use wire suitable for at least 75 degrees C.

TABLE 4
OPTIONAL FIELD INSTALLED HEATER PACKAGES
ARE ONLY TO BE USED WITH THE AIR CONDITIONING MODELS AS INDICATED BELOW

Heater Package Model No.	Volts and Phase	R	R	R	R	R	R	R	R	R	R
		P	P	P	P	P	P	P	P	P	P
		M	M	M	M	M	M	M	M	M	M
		A	A	A	A	A	A	A	A	A	A
		4	4	4	4	4	4	6	6	6	6
		2	2	2	8	8	8	0	0	0	0
			B	C		B	C		B	C	
EH5RA-A10	240/208-1	S	A	A	S	A	A	S	A	A	
EH5RA-A15		S	A	A	S	A	A	S	A	A	
EH5RA-A20		S	A	A	S	A	A	S	A	A	
EH5RA-A25		S	A	A	S	A	A	S	A	A	
EH5RA-B09	240/208-3	A	S	A	A	S	A	A	S	A	
EH5RA-B15		A	S	A	A	S	A	A	S	A	
EH5RA-B24		A	S	A	A	S	A	A	S	A	
EH5RA-C09	480-3	A	A	S	A	A	S	A	A	S	
EH5RA-C15		A	A	S	A	A	S	A	A	S	
EH5RA-C24		A	A	S	A	A	S	A	A	S	

S Standard application--Heater volts and phase same as basic unit.
A Alternate application--Heater volts and phase different from basic unit.

IMPORTANT

The equipment covered in this manual is to be installed by trained, experienced service and installation technicians. All ductwork, supply and return, must be properly sized for the design air flow requirement of the equipment. Air Conditioning Contractors of America (ACCA) is an excellent guide to proper sizing. All ductwork or portions thereof not in the conditioned space should be properly insulated in order to both conserve energy and prevent condensation or moisture damage.

SHIPPING DAMAGE

Upon receipt of equipment, the carton should be checked for external signs of shipping damage. If damage is found, the receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier's agent.

UNPACKING THE SELF-CONTAINED UNIT

It is recommended that the unit be unpacked at the installation site to minimize damage due to handling.

1. Cut and remove the metal band from around unit.
2. Remove the carton from the unit.
3. The installation manual is contained in an envelope shipped with the unit. Make sure that it does not get lost.
4. Carefully block up the unit and remove the shipping skid.
5. **CAUTION: DO NOT** tip the unit on its side. Oil may enter the compressor cylinders and cause starting or operating trouble. If unit has been set on its side, restore to upright position and do not run for several hours. Also run intermittently for a few seconds. Do this three or four times with three minutes in between. Observe abnormal compressor noise.

GENERAL

The refrigerant system is completely assembled and charged. All internal wiring is complete.

These instructions explain the recommended method to install the air cooled self-contained unit and the electrical wiring connections to the unit.

These instructions and any instructions packaged with any separate equipment required to make up the entire air conditioning system should be carefully read before beginning the installation. Note particularly "Starting Procedure" and any tags and/or labels attached to the equipment.

While these instructions are intended as a general recommended guide, they do not supersede any national and/or local codes in any way. Authorities having jurisdiction should be consulted before the installation is made.

INSTALLATION

Size of the unit for a proposed installation should be based on heat loss calculation made according to methods of National Warm Air Heating and Air Conditioning Association. The air duct should be installed in accordance with the Standards of the National Fire Protection Association for the Installation of Air Conditioning and Ventilating Systems of Other Than Residence Type, NFPA No. 90A and Residence Type Warm Air Heating and Air Conditioning Systems, NFPA No. 90B. Where local regulations are at a variance with instructions, installer should adhere to local codes.

The unit casing itself is suitable for "0" inch clearance, but the first two feet of supply air duct requires one inch clearance to combustible material.

WARNING: Failure to provide the one inch clearance for the first two feet between the supply duct and a combustible surface can result in fire.

DUCTWORK

Design the ductwork according to methods given by the National Warm Air Heating and Air Conditioning Association. When duct runs through unheated spaces, it should be insulated with a minimum of one inch of insulation. Use insulation with a vapor barrier on the outside of the insulation. Flexible joints should be used to connect the duct work to the equipment in order to keep the noise transmission to a minimum.

LOCATING THE UNIT

A location on the roof must be chosen that will provide adequate support to the unit, while at the same time allowing clearance for the supply air and return air duct connections to the RA4260 roof adapter (see layout and dimensions). **NOTE:** The RA4260 roof adapter **MUST BE USED** to assure a leak-free installation and the UL approval is contingent upon the use of this mating adapter.

ROOF CURB FABRICATION

The roof curb (extension section between actual roof and RA4260 roof adapter) could be fabricated from either sheet steel or nominal dimensional lumber. In either case, the OD dimension of the extension section must be sized to fit the RA4260 adapter dimensions as shown.

All corners, seams or joints must be sealed to assure a leak-free installation. The height of the curb section is determined by installation requirements such as degree slope of roof, direction that the outdoor (exposed) coil faces, and geographic location. The unit **MUST SET LEVEL** when installed, and should be high enough to provide proper defrost drainage from outdoor coil during heating cycle.

A suggested design for a wood frame type construction is shown on page 1.

OPTIONAL ELECTRIC HEATER PACKAGES

The BH5RA series electric heater packages are available as options. Each package comes complete with heaters and controls.

IMPORTANT: A separate power entrance is required for the heater package. **DO NOT** attempt to wire a basic unit and a heater package to one power circuit.

INSTALLATION

Installation of the heat package requires removing the unit blower from its securing slide mount, inserting the heat package into the same mount and reinstalling the unit blower into a similar mount on the heat package. A minimal amount of wiring is required. Refer to the heat package installation instructions for detailed installation information.

WIRING--MAIN POWER

Refer to the unit rating plate for wire sizing information and maximum fuse or "HACR Type" circuit breaker size. Each unit is marked with a "Minimum Circuit Ampacity." This means that the field wiring used must be

sized to carry that amount of current. Refer to the National Electrical Code for complete current carrying capacity data on the various insulation grades of wiring material.

If an optional heater package is installed, a separate power circuit must be added. Refer to the Electrical Information Chart for circuit information. DO NOT ATTEMPT TO COMBINE A BASIC UNIT AND A HEATER PACKAGE TO ONE POWER SUPPLY CIRCUIT.

The unit rating plate lists a "Maximum Time Delay Fuse" or "HACR Type" circuit breaker that is to be used with the equipment. The correct size must be used for proper circuit protection and also to assure that there will be nuisance tripping due to the momentary high starting current of the compressor motor.

CONDENSATE DRAINAGE

A 3/4" FPT coupling is provided to connect a condensate drain line to and is located on side opposite outdoor coil.

PRESSURE SERVICE PORTS

High and low pressure service ports are installed on all units so that the system operating pressures can be observed. Pressure charts can be found later in the manual covering all models. It is imperative to match the correct pressure chart to the unit by model number.

REFRIGERANT CHARGE

The correct system R-22 charge is shown on the unit rating plate. Optimum unit performance will occur with a refrigerant charge resulting in a suction line temperature (6" from compressor) as shown in the following table:

TABLE 5

Model	Rated Airflow	95 Degree F OD Temperature	82 Degree F OD Temperature
RPMA42	1500	53 - 55	63 - 65
RPMA48	1700	56 - 58	64 - 66
RPMA60	1900	49 - 51	58 - 60

The above suction line temperatures are based upon 80 degree F dry bulb/67 degree wet bulb (50% R.H.) temperature and rated airflow across the evaporator during cooling cycle.

AIR FILTER

Two 16" x 30" x 1" disposable fiberglass type filters are located inside the unit for air filtration of both return air from structure and for optional fresh air intake (see below).

Access to the filter is by removing the panel located next to the condensate drain connection.

FRESH AIR INTAKE

The fresh air intake cover is a manual damper operated device to allow intake of fresh air whenever indoor blower is operating. The damper position can be manually set and locked in position with a wing nut. It is held in place by two screws and has a hardware cloth screen to prevent entry of birds or rodents. An optional cover plate is available if fresh air intake is not used.

CRANKCASE HEATERS

All single and three phase models have an insertion well-type heater located in the lower section of the compressor housing. This is a self-regulating type heater that draws only enough power to maintain the compressor at a safe temperature.

Crankcase heat is essential to prevent liquid refrigerant from migrating to the compressor, causing oil pump out on compressor start-up and possible valve failure due to compressing a liquid.

The decal in Figure 3 is affixed to all outdoor units detailing the start-up procedure. This is very important. Please read carefully.

FIGURE 3

IMPORTANT

THESE PROCEDURES MUST BE FOLLOWED AT INITIAL START-UP AND AT ANY TIME POWER HAS BEEN REMOVED FOR 12 HOURS OR LONGER.

TO PREVENT COMPRESSOR DAMAGE WHICH MAY RESULT FROM THE PRESENCE OF LIQUID REFRIGERANT IN THE COMPRESSOR CRANKCASE

1. MAKE CERTAIN THE ROOM THERMOSTAT IS IN THE "OFF" POSITION, (THE COMPRESSOR IS NOT TO OPERATE).
2. APPLY POWER BY CLOSING THE SYSTEM DISCONNECT SWITCH. THIS ENERGIZES THE COMPRESSOR HEATER WHICH EVAPORATES THE LIQUID REFRIGERANT IN THE CRANKCASE.
3. ALLOW 4 HOURS OR 60 MINUTES PER POUND OF REFRIGERANT IN THE SYSTEM AS NOTED ON THE UNIT RATING PLATE, WHICHEVER IS GREATER.
4. AFTER PROPERLY ELAPSED TIME THE THERMOSTAT MAY BE SET TO OPERATE THE COMPRESSOR.
5. EXCEPT AS REQUIRED FOR SAFETY WHILE SERVICING — DO NOT OPEN SYSTEM DISCONNECT SWITCH.

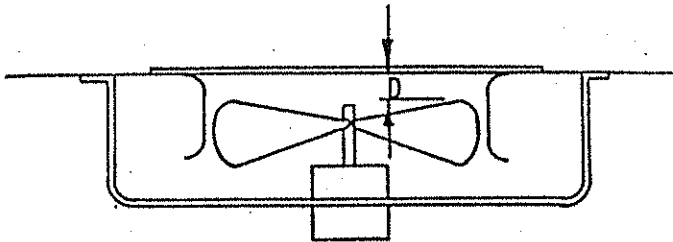
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FAN BLADE SETTING DIMENSIONS

Shown in the drawing below are the correct fan blade setting dimensions for proper air delivery across the outdoor coil.

Any service work requiring removal or adjustment in the fan and/or motor area will require that the dimensions below be checked and blade adjusted in or out on the motor shaft accordingly.

FIGURE 4



Model	Dimension D
RPMA42	2.00"
RPMA48	2.00"
RPMA60	2.00"

SERVICE HINTS

1. Caution homeowner to maintain clean air filters at all time. Also not to needlessly close off supply and return air registers. This reduces air flow through the system which shortens equipment service life as well as increasing operating costs.
2. The wall thermostats perform multiple functions. Be sure that all function switches are correctly set for the desired operating mode before trying to diagnose any reported service problems.
3. Check all power fuses or circuit breakers to be sure that they are the correct rating.
4. Periodic cleaning of the outdoor coil to permit full and unrestricted airflow circulation is essential.

TABLE 6

COOLING

Air Temperature Entering Outdoor Coil Degree F

Model	Return Air Temperature	Pressure	°	°	°	°	°	°	°	°	°
			75	80	85	90	95	100	105	110	115
RPMA42	75 deg. DB	Low Side	66	68	69	71	73	74	76	78	79
	62 deg. WB	High Side	195	210	226	242	257	273	289	304	320
	80 deg. DB	Low Side	70	72	74	76	78	80	81	83	85
	67 deg. WB	High Side	200	216	232	248	264	280	296	312	328
	85 deg. DB	Low Side	75	77	79	81	84	85	87	89	91
	72 deg. WB	High Side	207	223	240	256	273	289	306	323	339
RPMA48	75 deg. DB	Low Side	66	67	69	72	72	73	75	77	78
	62 deg. WB	High Side	203	219	235	251	267	283	300	317	332
	80 deg. DB	Low Side	70	72	73	75	77	78	80	82	83
	67 deg. WB	High Side	208	225	241	258	274	291	307	323	340
	85 deg. DB	Low Side	75	77	79	80	83	84	86	88	89
	72 deg. WB	High Side	216	233	250	267	284	301	318	335	352
RPMA60	75 deg. DB	Low Side	66	67	69	71	72	74	76	77	79
	62 deg. WB	High Side	230	247	264	281	298	315	332	349	366
	80 deg. DB	Low Side	70	72	73	75	77	79	80	82	84
	67 deg. WB	High Side	236	253	270	288	306	323	340	358	375
	85 deg. DB	Low Side	75	77	79	81	83	85	86	88	90
	72 deg. WB	High Side	244	262	280	298	317	334	352	370	388

Low side pressure + 2 PSIG
 High side pressure + 5 PSIG

Tables are based upon rated CFM (airflow) across the evaporator coil and should be found under section titled "Refrigerant Charge" elsewhere in manual. If there is any doubt as to correct operating charge being in the system, the charge should be removed, system evacuated, and recharged to serial plate instructions.

REFRIGERANT CHARGE

The correct system R-22 charge is shown on the unit rating plate. Optimum unit performance will occur with a refrigerant charge resulting in a suction line temperature (6" from compressor) as shown in the following table:

TABLE 6

Model	Rated Airflow	95 F OD Temperature	82 F OD Temperature
RPMH30B	1100	59 - 61	69 - 71
RPMH36B	1275	64 - 66	75 - 77
RPMH36C	1200	56 - 58	59 - 61

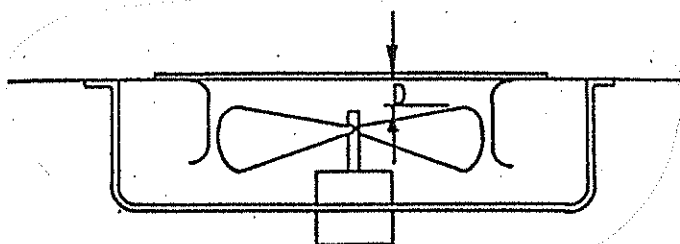
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Shown in the drawing below are the correct fan blade setting dimensions for proper air delivery across the outdoor coil.

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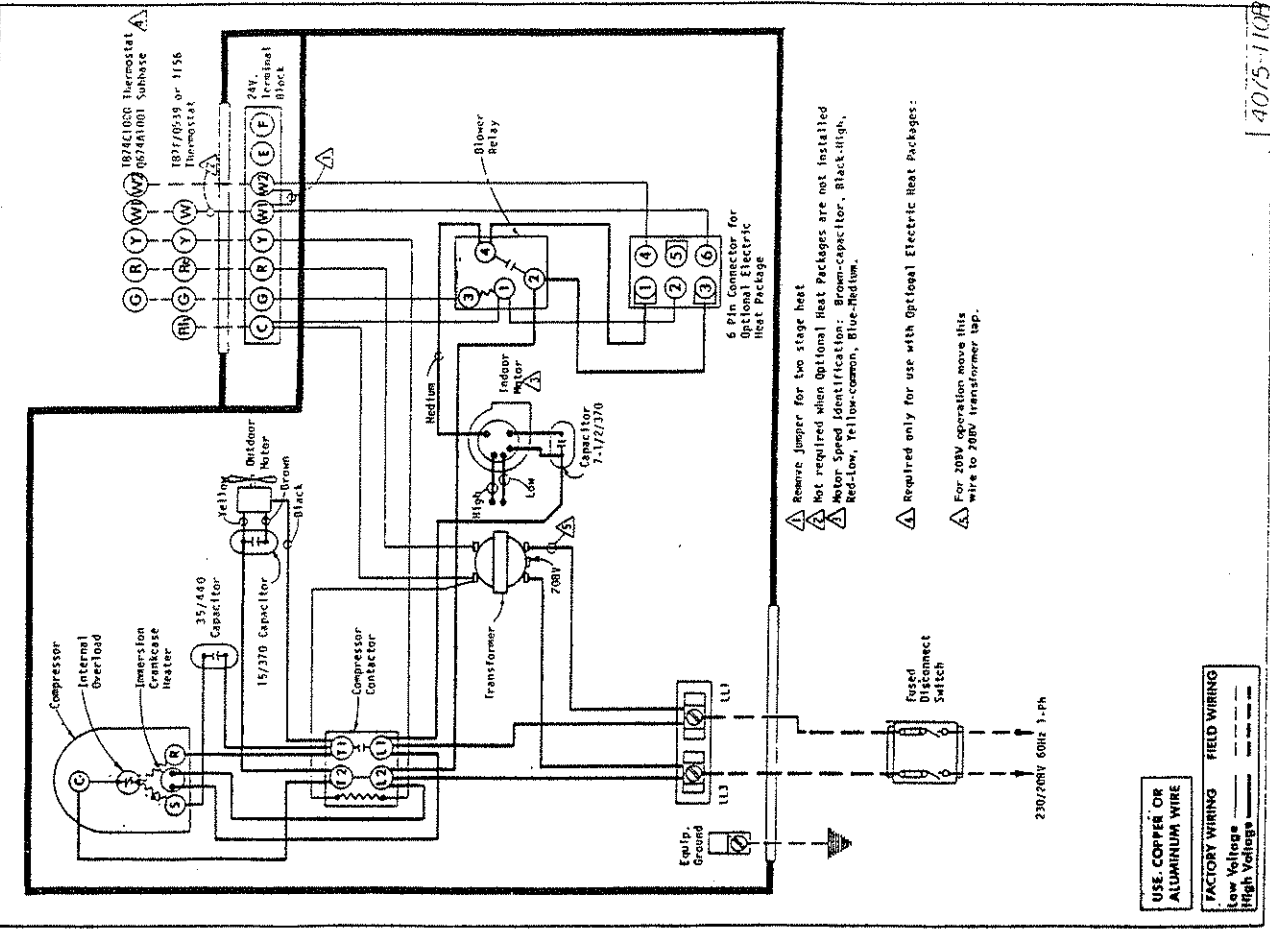
FIGURE 7



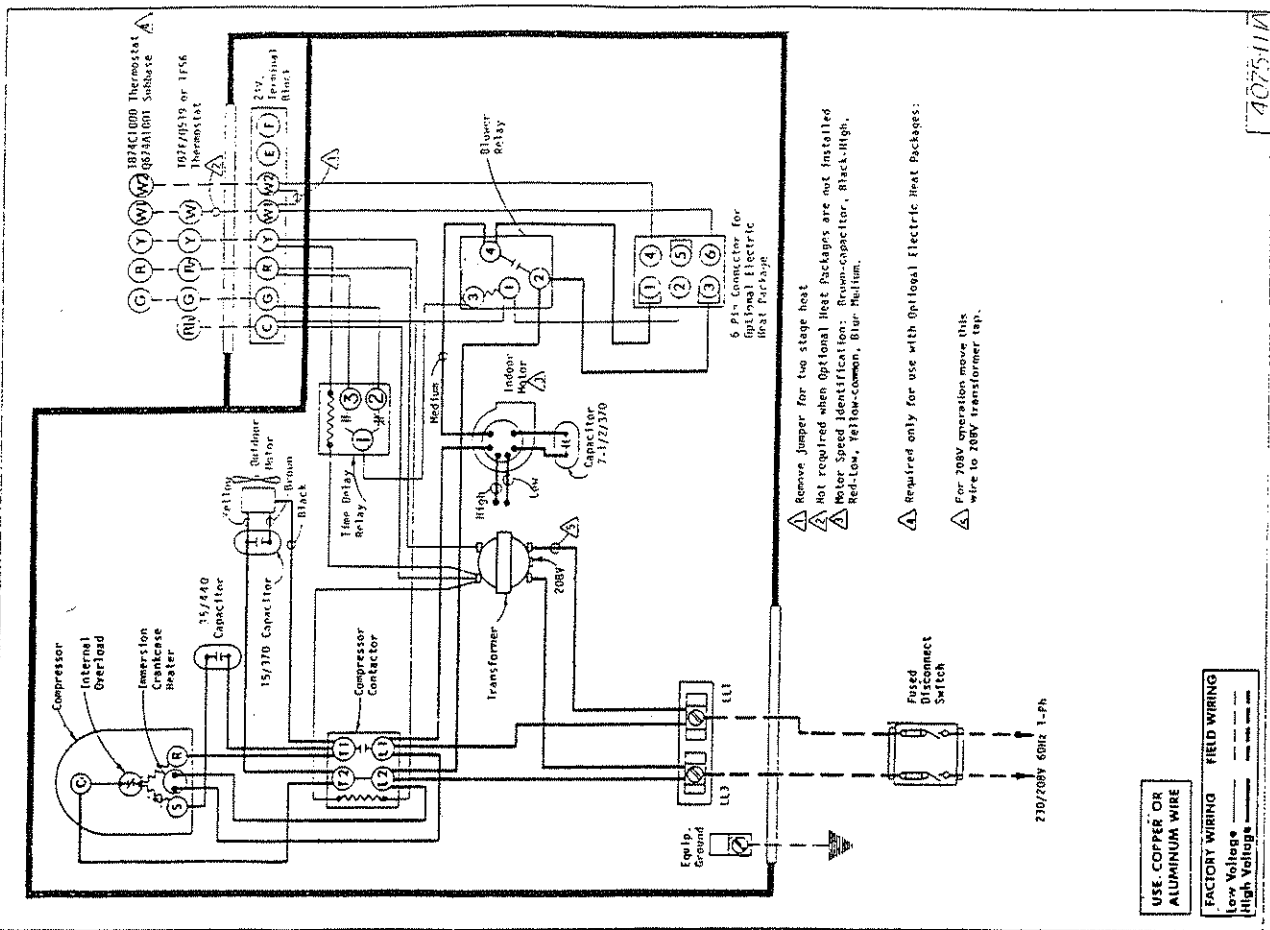
Model	Dimension D
RPMH30B	2.00"
RPMH36B	2.00"
RPMH36C	2.00"

SERVICE HINTS

1. Caution homeowner to maintain clean air filters at all times. Also not to needlessly close off supply and return air registers. This reduces air flow through the system, which shortens equipment service life as well as increasing operating costs.
2. Switching to heating cycle at 75 degrees F or higher outside temperature may cause a nuisance trip of the manual reset high pressure switch.
3. The heat pump wall thermostats perform multiple functions. Be sure that all function switches are correctly set for the desired operating mode before trying to diagnose any reported service problems.
4. Check all power fuses or circuit breakers to be sure that they are the correct rating.
5. Periodic cleaning of the outdoor coil to permit full and unrestricted airflow circulation is essential.



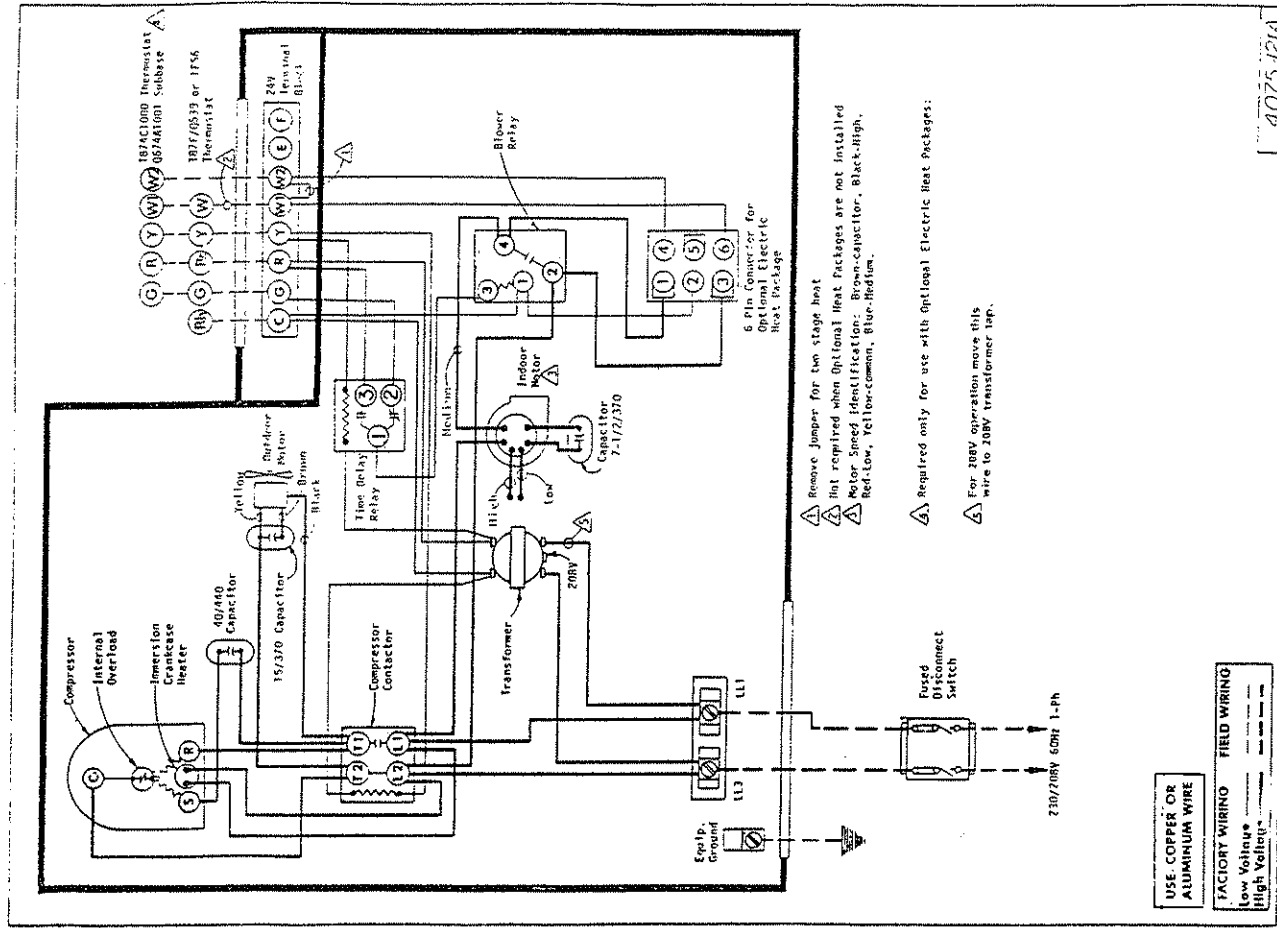
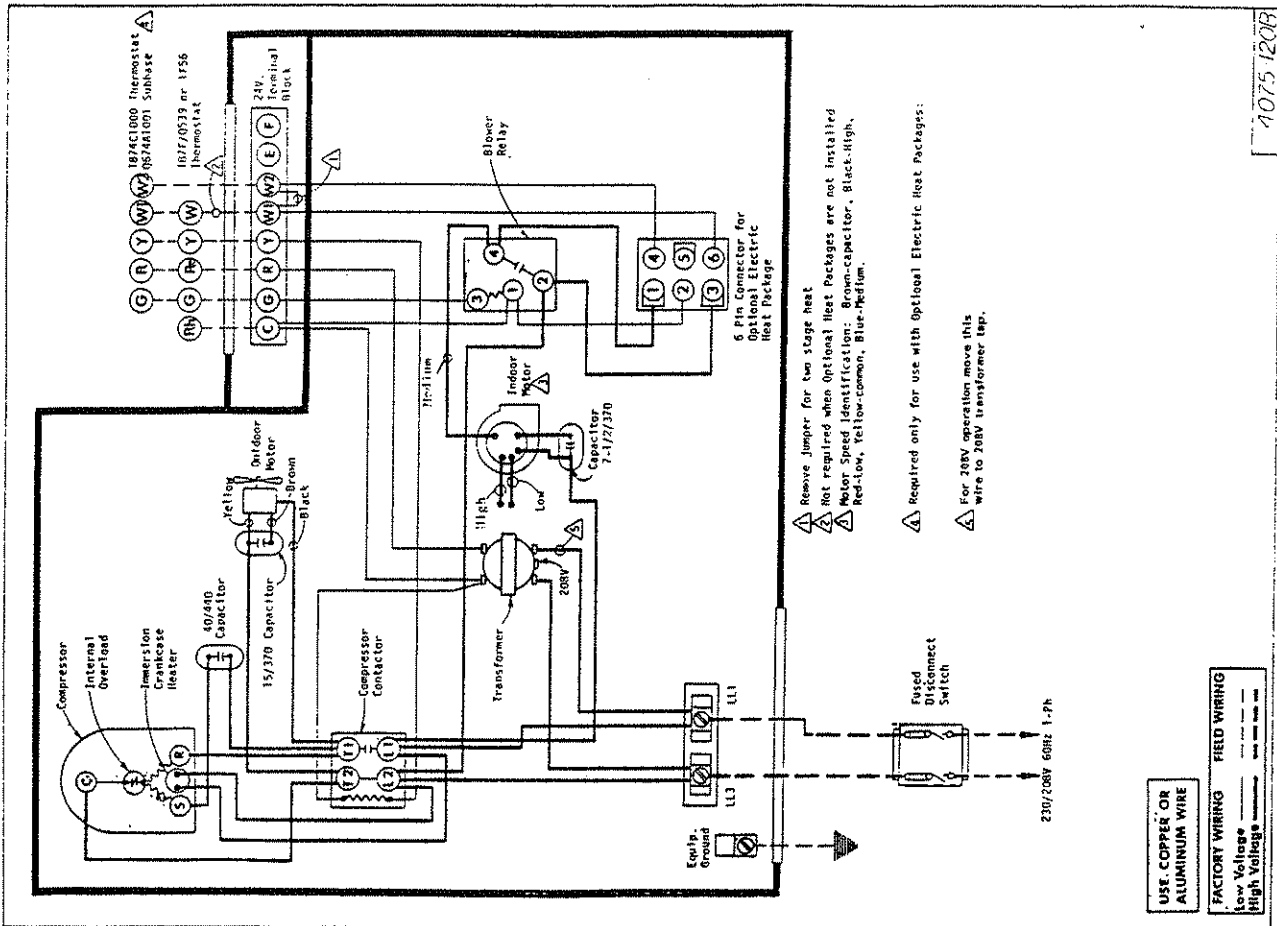
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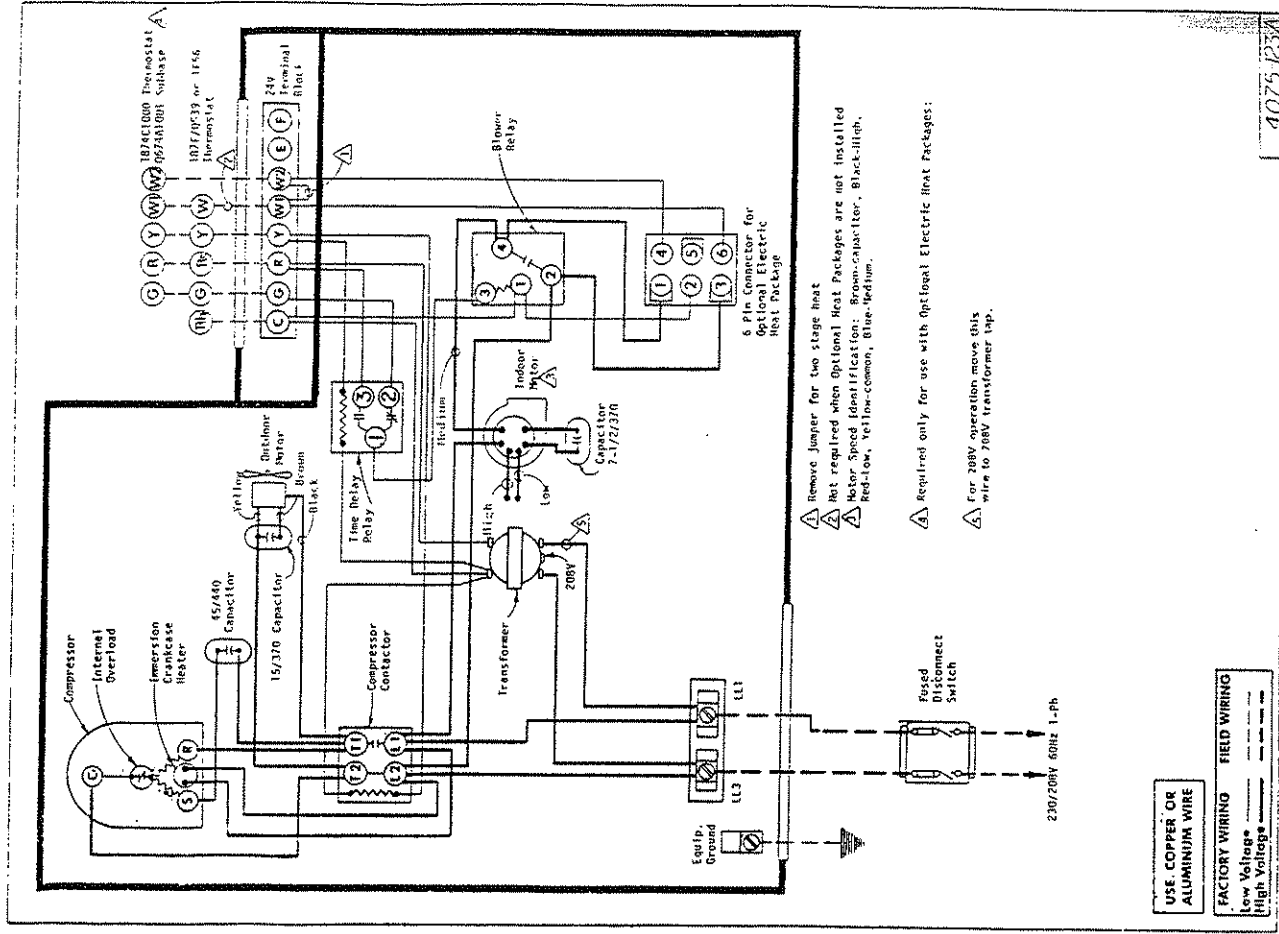
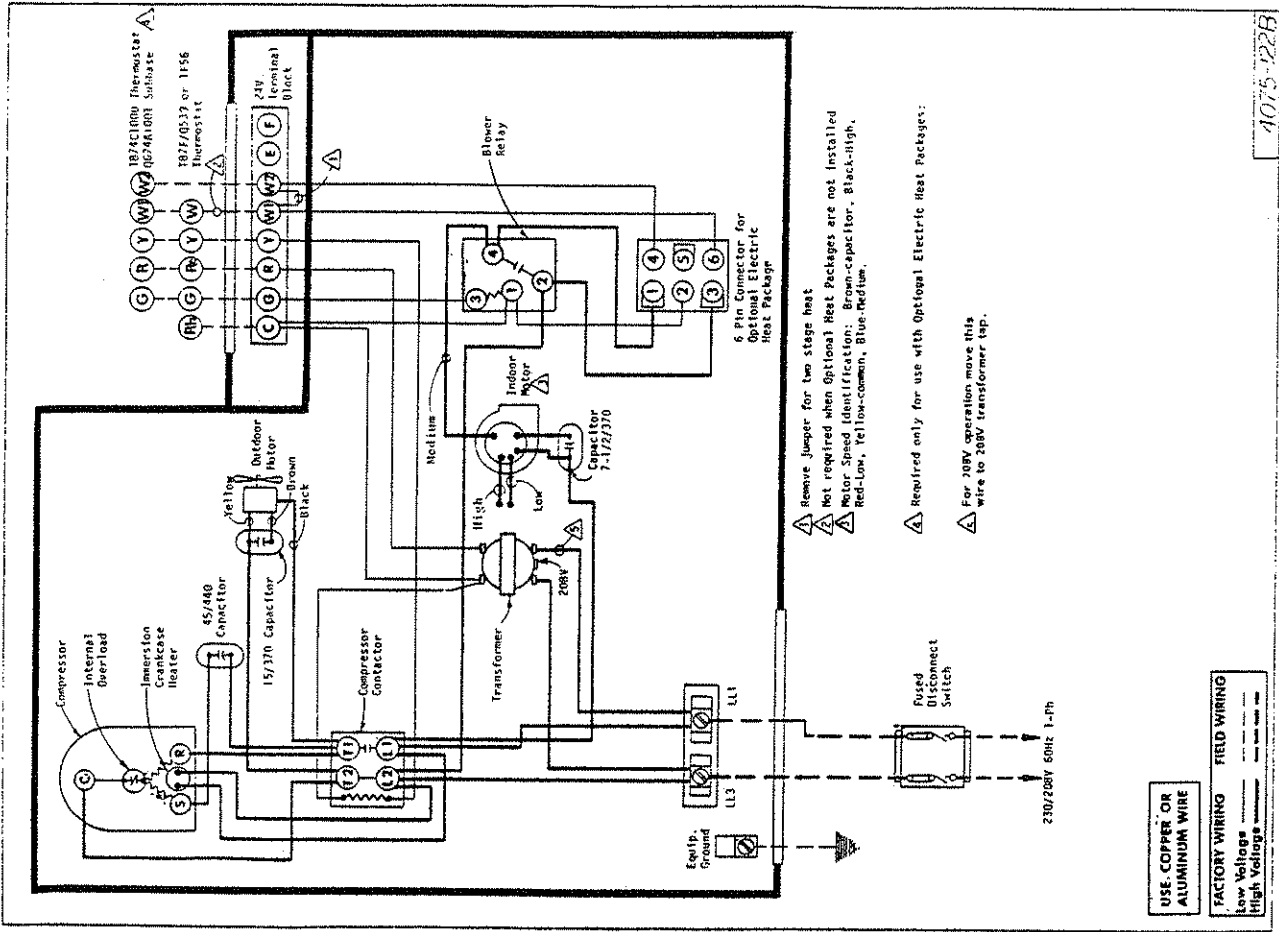


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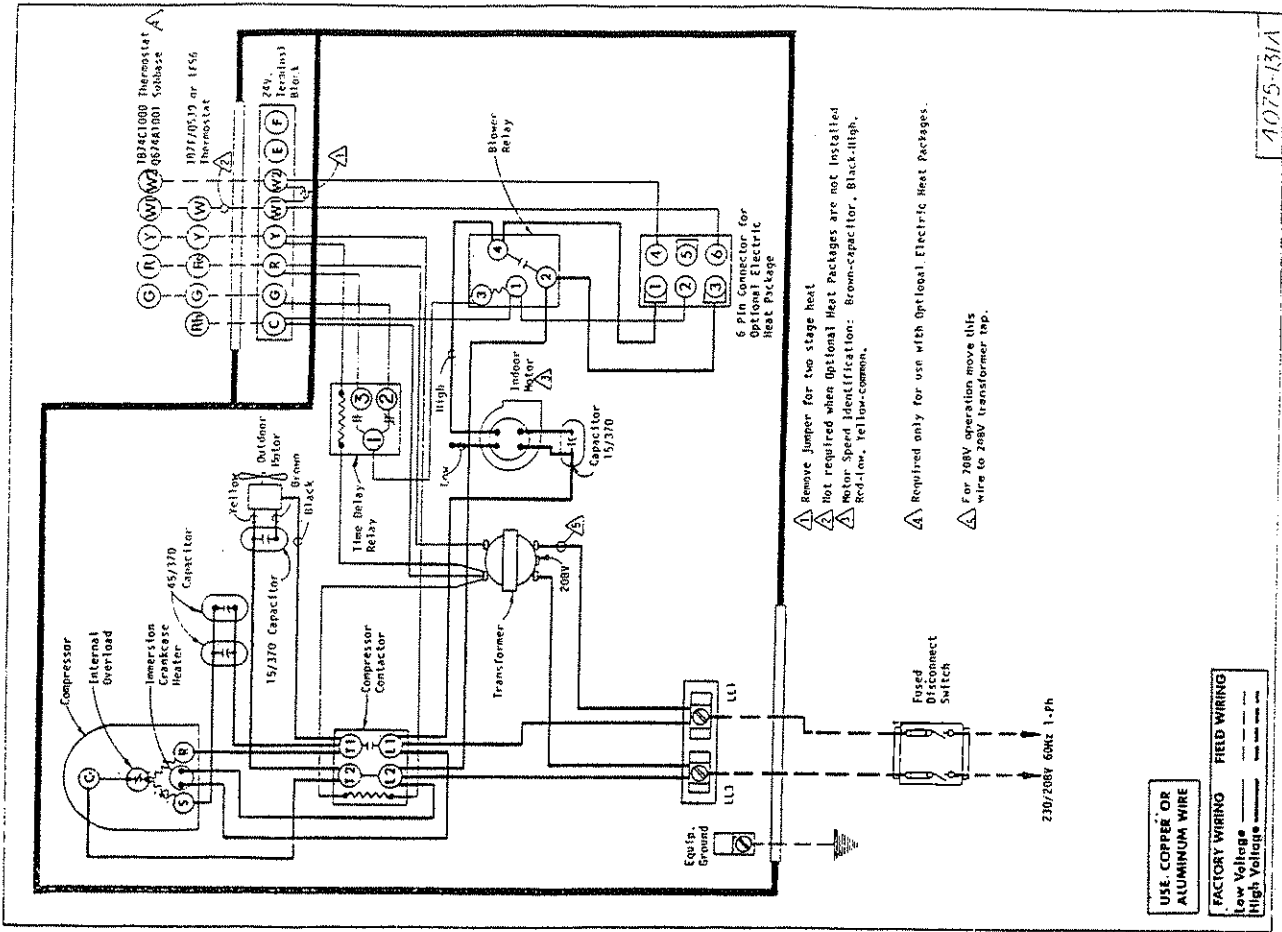
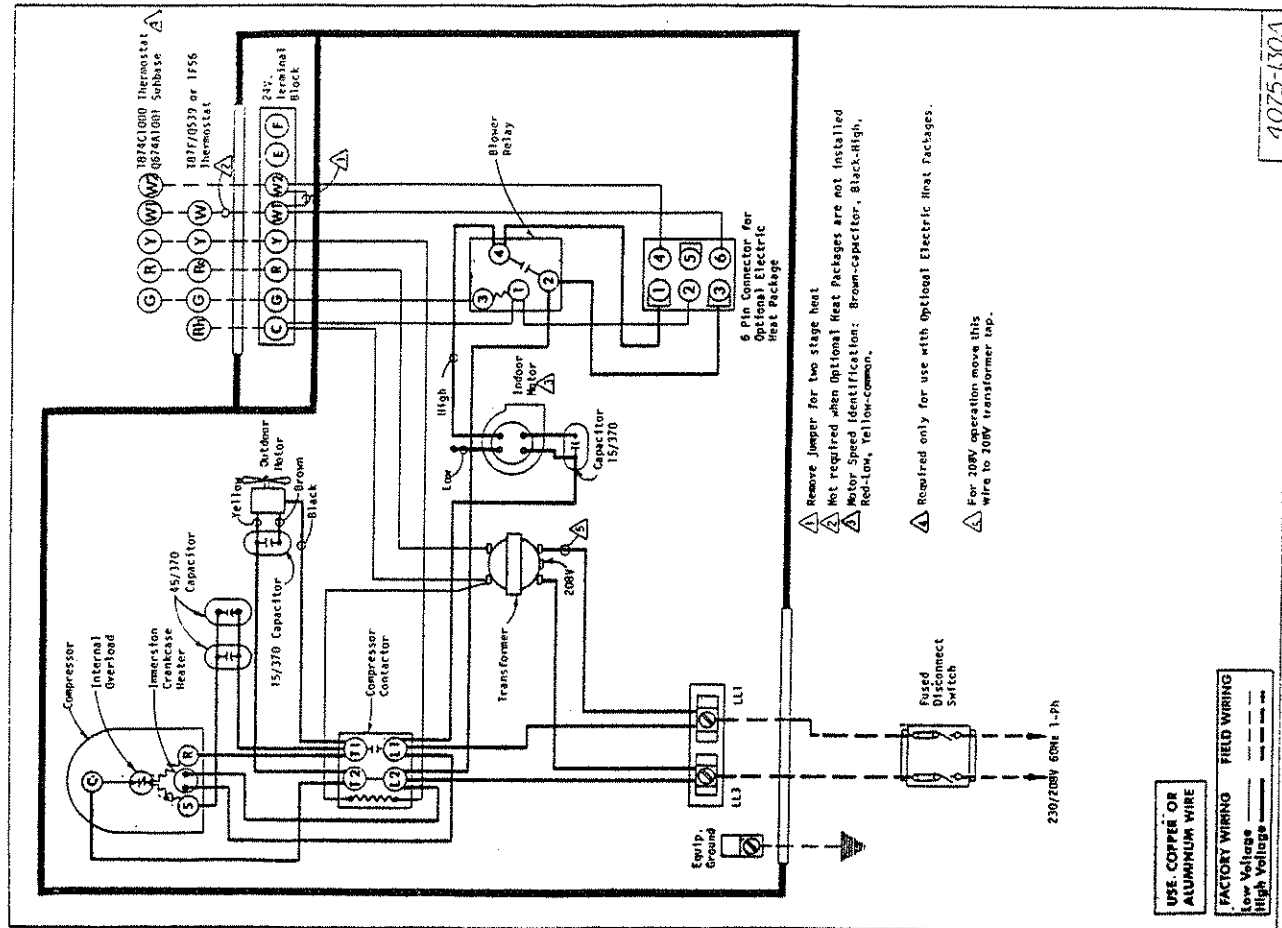
- ⚠ Remove jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ Motor Speed Identification: Brown-capacitor, Black-High, Red-Low, Yellow-Common, Blue-Medium.
- ⚠ Required only for use with Optional Electric Heat Packages:
- ⚠ For 208V operation move this wire to 208V transformer tap.

- ⚠ Remove jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ Motor Speed Identification: Brown-capacitor, Black-High, Red-Low, Yellow-Common, Blue-Medium.
- ⚠ Required only for use with Optional Electric Heat Packages:
- ⚠ For 208V operation move this wire to 208V transformer tap.



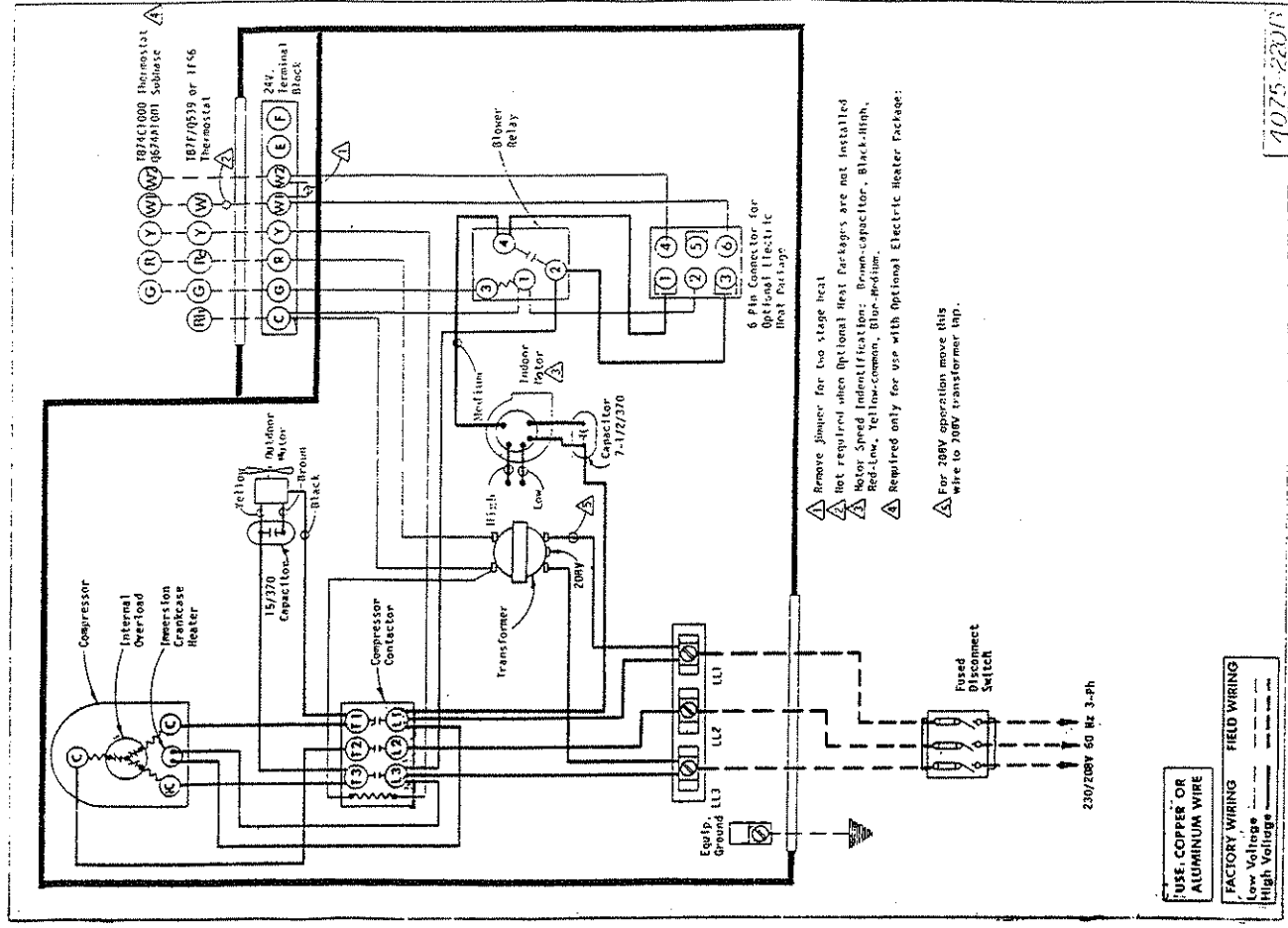
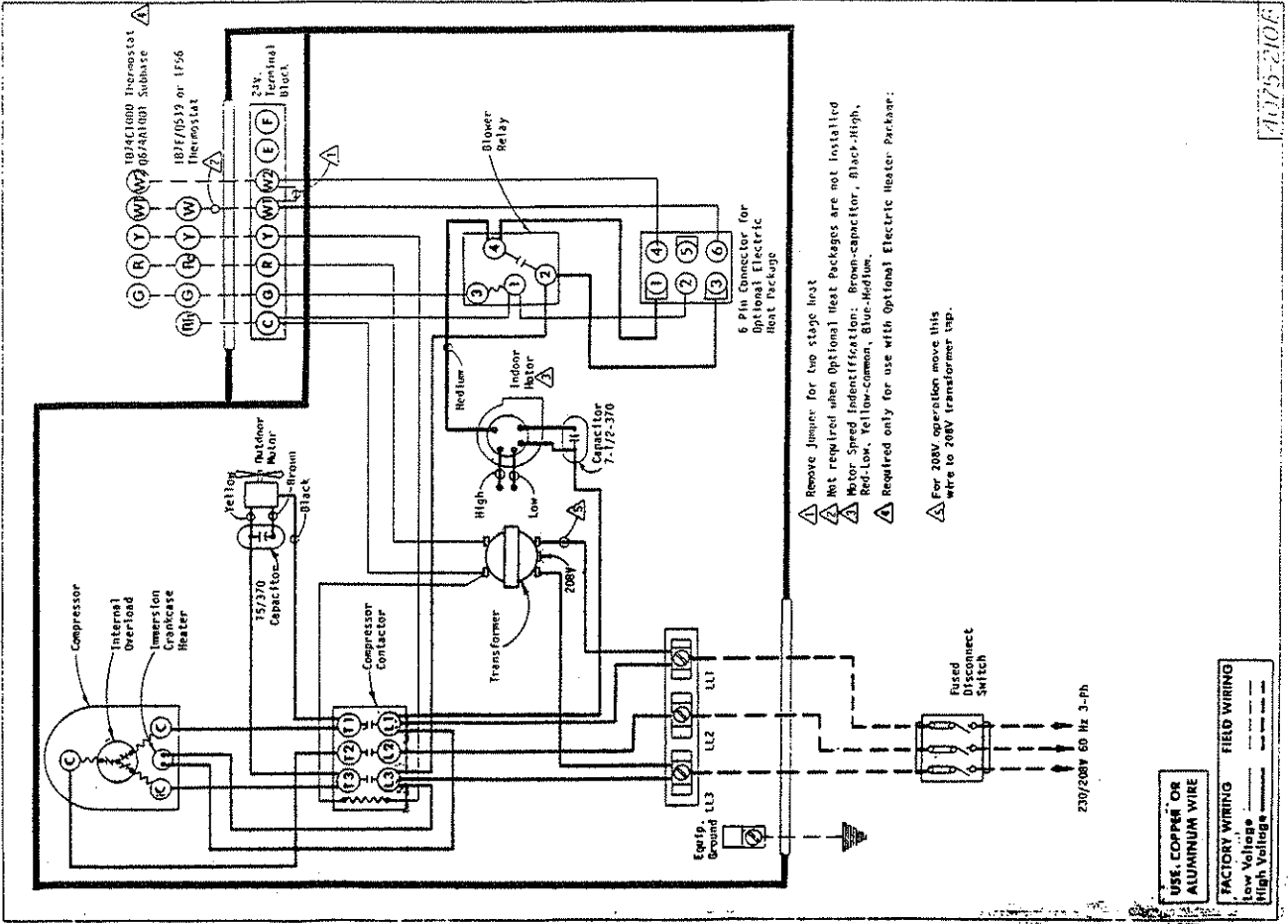


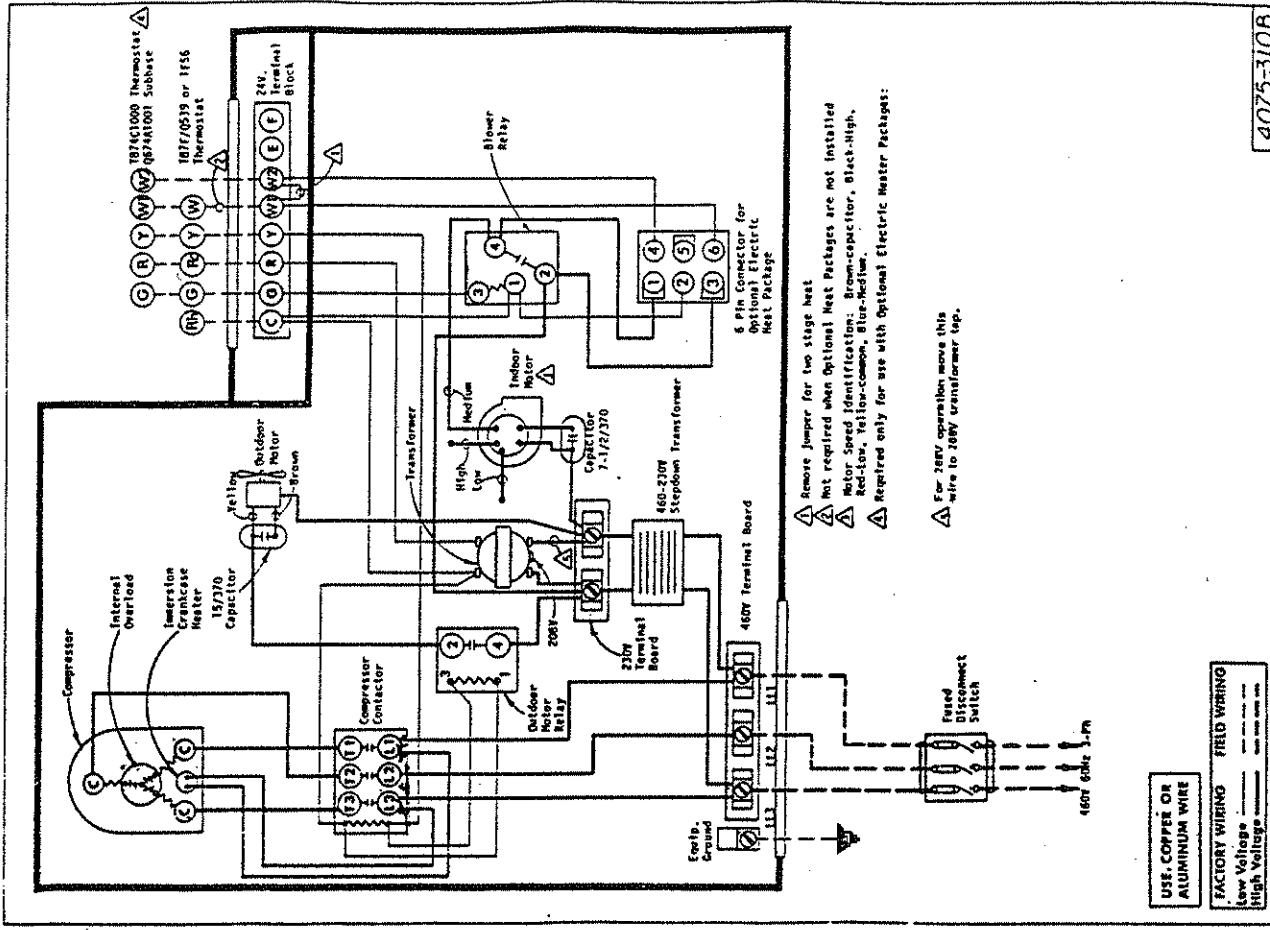
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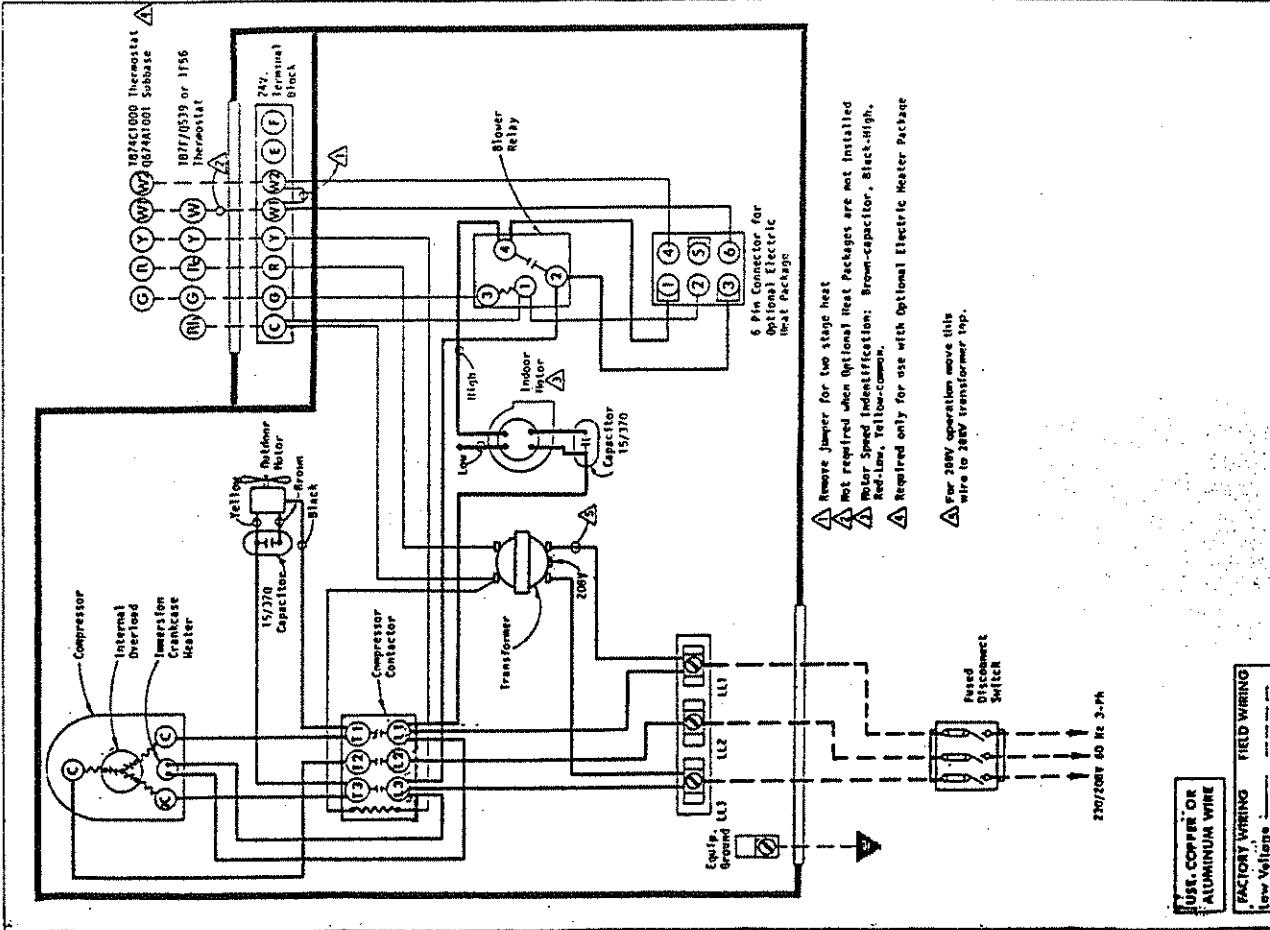
- ⚠ Remove jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ Motor Speed Identification: Brown-capacitor, Black-High, Red-Low, Yellow-common, Blue-Medium
- ⚠ Required only for use with Optional Electric Heater Packages:
- ⚠ For 208V operation move this wire to 108V transformer tap.

USE COPPER OR ALUMINUM WIRE

FACTORY WIRING **FIELD WIRING**

Low Voltage ————

High Voltage - - - - -



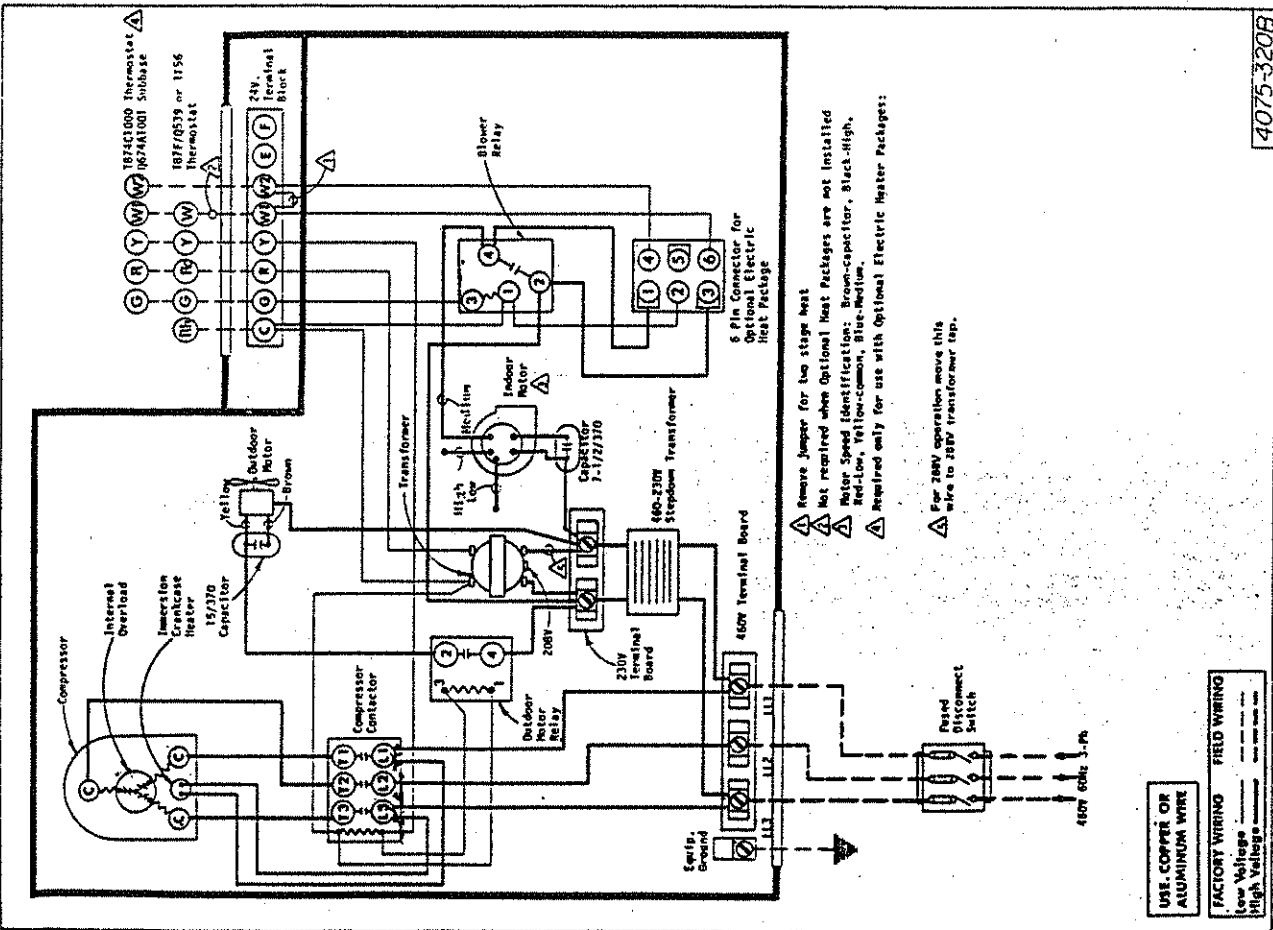
- ⚠ Remove jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ Motor Speed Identification: Brown-capacitor, Black-High, Red-Low, Yellow-common
- ⚠ Required only for use with Optional Electric Heater Package
- ⚠ For 208V operation move this wire to 208V transformer tap.

USE COPPER OR ALUMINUM WIRE

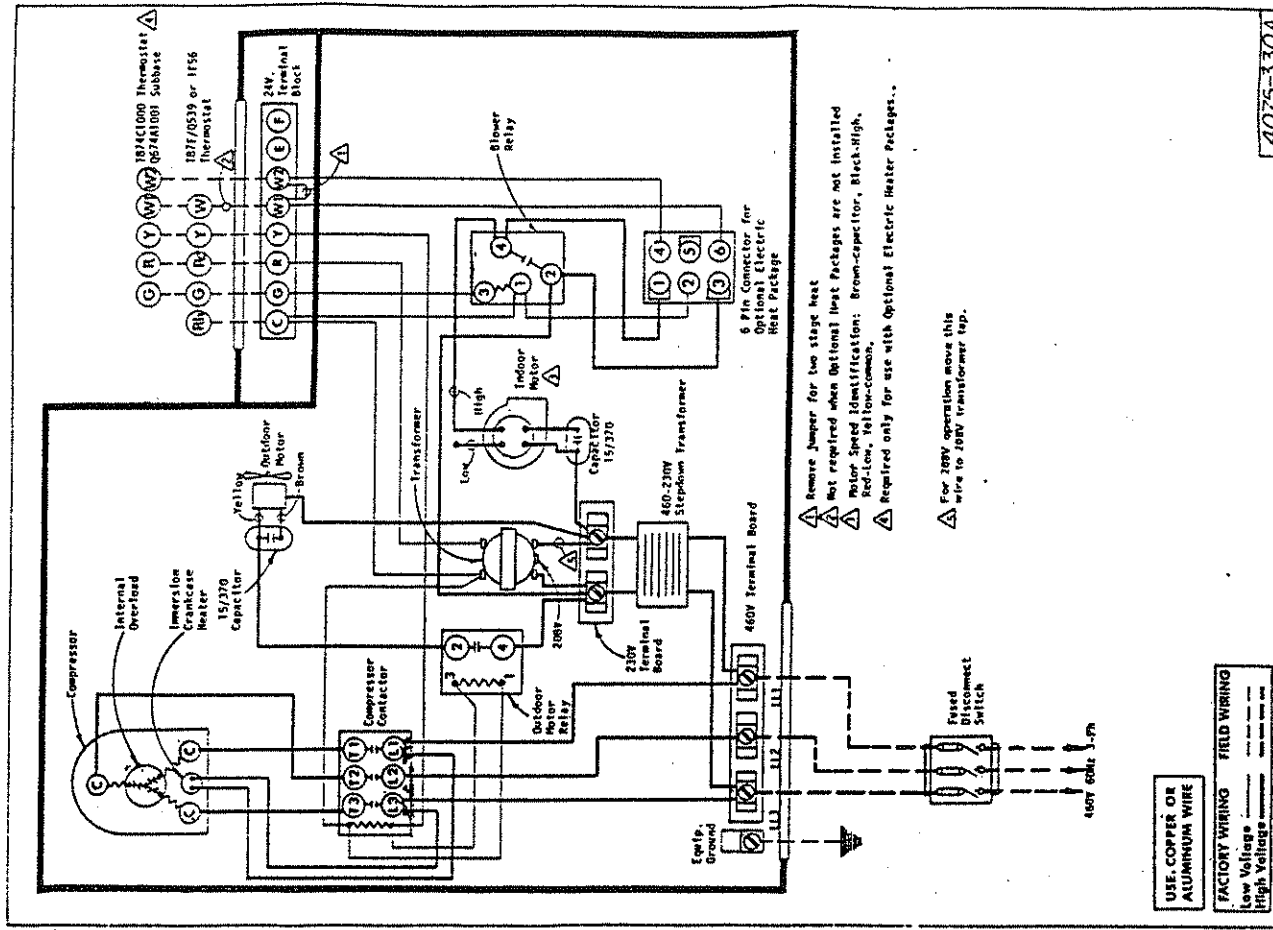
FACTORY WIRING **FIELD WIRING**

Low Voltage ————

High Voltage - - - - -



- ⚠ Reverse jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ Motor Speed Identification: Brown-capacitor, Black-High, Red-Low, Yellow-combin.
- ⚠ Required only for use with Optional Electric Heater Packages:
- ⚠ For 208V operation move this wire to 208V transformer tap.



- ⚠ Reverse jumper for two stage heat
- ⚠ Not required when Optional Heat Packages are not installed
- ⚠ Motor Speed Identification: Brown-capacitor, Black-High, Red-Low, Yellow-combin.
- ⚠ Required only for use with Optional Electric Heater Packages...
- ⚠ For 208V operation move this wire to 208V transformer tap.